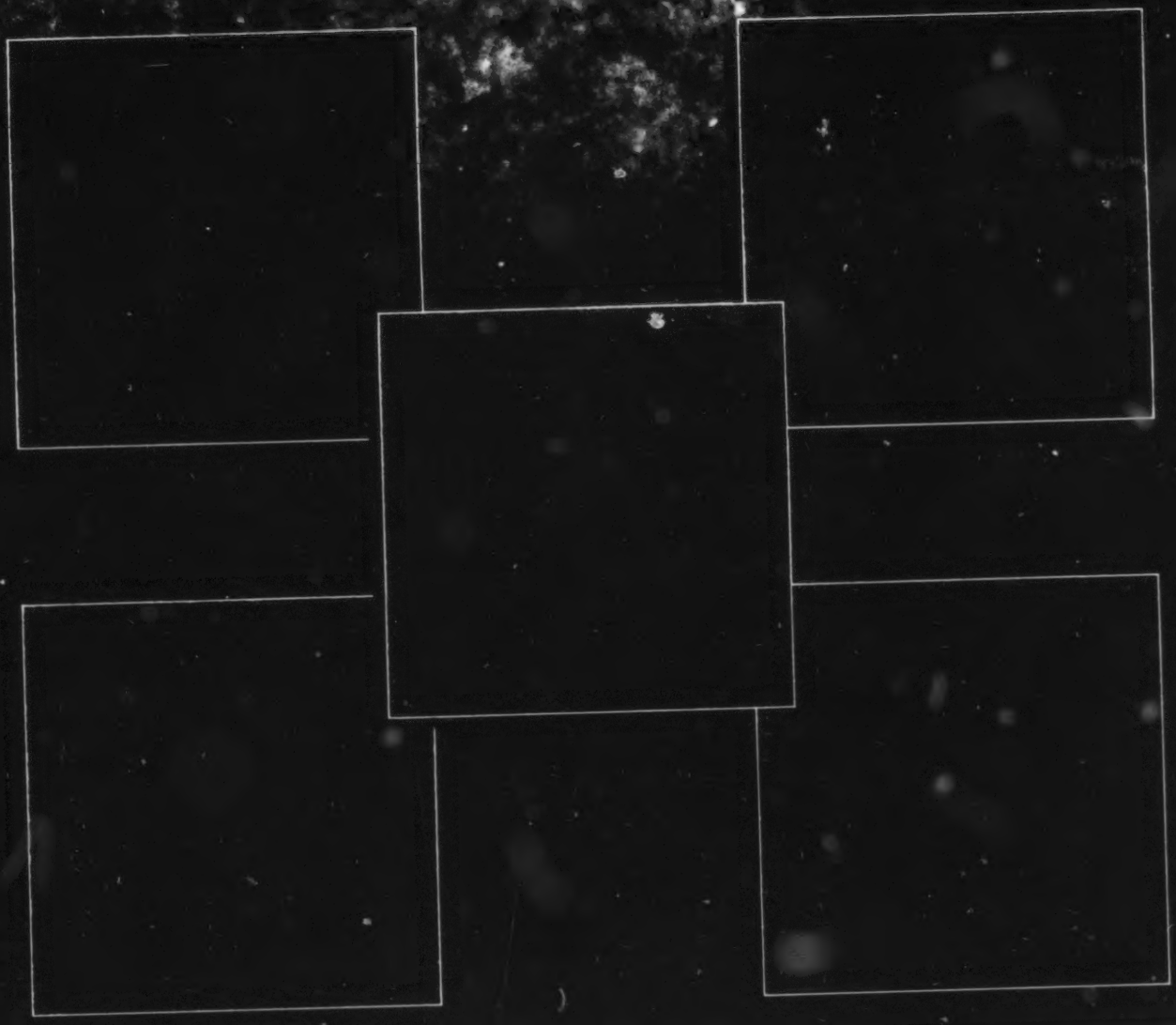
Building Stone
OPPORTUNITIES
in Central Ontario



CANADA
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Exploitation Minérale

Building Stone OPPORTUNITIES in Central Ontario

by

Staff of the Ministry of Northern Development and Mines,
Resident Geologist's Office, Dorset, Ontario, Canada.

March, 1989.

Front Cover:

Background:	Meta-arkose, Killbear.
Top Left:	Hornblende quartz syenite, Milford Bay.
Top Right:	Granitic migmatite, Ardbeg.
Centre:	Granitic migmatite, Woods Road.
Bottom Left:	Granitic migmatite, Ardbeg.
Bottom Right:	Augen Gneiss, Lehman Quarry.

Killbear photo is actual size; the remainder are approximately 10× reductions.

See text for descriptions of these stones.

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Building Stone Opportunities in Central Ontario

Introduction

The purpose of this brief report is to demonstrate the types of stone which occur in part of central Ontario, and to encourage members of the stone quarrying industry to evaluate some of these occurrences as possible sources of dimensional stone.

Since 1985, reconnaissance surveys for building stone have been made by staff of the Ontario Ministry of Northern Development and Mines in the area of central Ontario bounded by the French River and Lake Nipissing to the north, Algonquin Park west boundary to the east, Georgian Bay to the west, and the Muskoka Lakes to the south. This work culminated in late 1988 with the extraction of several small quarry blocks (200 kilos) for preparation into 12 inch tiles. Examples of some of these tiles are shown on the front cover and at the end of this summary report. Most are highly patterned or "veined granites".

Background

The study area includes parts of the districts of Muskoka, Parry Sound and Nipissing (see figure 1). This area is best known for its thinly splitting gneisses, which have been used for many decades as facing stone for walls, fireplaces, and as patio stone. Recent work, however, suggests that stone capable of producing 20-30 tonne quarry blocks may be also be present in the area. Such stone is the basis of today's granite dimensional stone industry: it is sawn into thin panels and tiles to be used as exterior and interior cladding and flooring in many modern construction projects.

During 1985 several promising building stone sites were identified in the course of a reconnaissance survey of southeastern and central Ontario (Verschuren et al., 1986). Some of these sites are described again in this report. Subsequent work recognized that conventional uniform, equigranular granites are rare in this area, but that attractive, highly patterned granites are abundant. Given the inroads which "veined granites" from India and Brazil have made into the dimensional stone market in recent years, efforts were made to determine whether comparable stone occurs in central Ontario. This report highlights some of the more prospective sites identified to date.

Geology

This area of central Ontario is part of the Central Gneiss Belt of the Grenville Province. The Central Gneiss Belt consists of strongly deformed, high grade metamorphic rocks. Figure 1 shows the simplified geology of the area. Three major rock groupings can be distinguished:

1. Orthogneiss or meta-plutonic rocks. These are the deformed and metamorphosed derivatives of the common igneous plutonic rocks, and include such diverse rock types as granite, charnockite, syenite, tonalite, and anorthosite. They display various colours, and in texture they range from almost unaltered granites to strongly foliated gneisses or migmatites. In spite of this range of textures, they tend to display a reasonable degree of homogeneity within given areas, which makes them the best candidates for use as dimensional stone.

2. Mixed Gneiss. This is a mixture of orthogneiss and paragneiss (gneiss derived from sedimentary or volcanic rock). Mixed gneiss forms the country rock into which the younger orthogneiss units shown on figure 1 were intruded. They are almost always too badly jointed and fractured, and consist of such varied interbedded rock types that they cannot be considered good prospects for dimensional stone. They may find applications as ashlar, landscaping and ornamental stone.

3. Domain Boundary Zones. Also known as "ductile shear zones", domain boundary zones consist of highly stretched and flattened rocks (including mylonite) of largely indeterminate origin. They occur as zones many tens of kilometres long and up to several kilometres wide and are characterized by their remarkably planar, parallel mineral foliation which permits the rock to be split into thin slabs and flagstones. The well known Mill Lake Quarry at Parry Sound produces flagstone from one of these major ductile shear zones. These stones are unlikely sources of dimensional stone, but, like the mixed gneiss, the variety of colour and texture within individual outcrops may lend itself to decorative applications, paving, ashlar and ornamental stone.

Current Programme

The current building stone programme has consisted of three phases:

A/ Roadside reconnaissance to locate outcrops with homogeneous composition, colour and texture with a minimal amount of jointing.
B/ Follow-up prospecting in the vicinity of the most promising areas identified in phase A.
C/ Extraction of small quarry blocks from the best sites for sawing and polishing into 12 inch tiles, and for preliminary ASTM testing. (At present no ASTM tests have been conducted on any of the samples).

Conclusions

All of the quarry blocks collected for sawing and polishing produced very attractive tiles which took a good polish. Tiles which were displayed at the Ontario Geological Survey's Open House in Toronto, December 1988, and at the Geological Survey of Canada's Open House at Ottawa in January 1989, attracted an overwhelming amount of interest, which could be interpreted as an encouraging market response. The results of a recent survey conducted for the Italian Marble Center, reported in Dimensional Stone Magazine, March 1988, indicated a significant trend toward the use of bold colours and the more intricate design, inlay and border effects as reasons for the trend to use stone in interiors. Many of the granites described in this report display colours and textures which would lend themselves to such applications.

The crucial question, however, is whether these stones can be quarried economically. If, as seems likely, the samples collected to date are sound, and the sites contain stone of uniform colour and texture, then the critical constraint is jointing and fracture density. Two sites which appear capable of producing a large proportion of 20-30 tonne quarry blocks are Woods Road and Milford Bay. There are positive and negative features associated with all the occurrences described in this report, and these factors are outlined in the descriptions of each occurrence.

The following pages describe the most promising stone occurrences discovered to date.

The following factors should be borne in mind by prospective developers:

1. Reconnaissance surveys have not been exhaustive, and have been limited largely to roadside outcrop examinations. There is still potential for further prospecting within easily accessible areas close to roads.
2. Samples for tile preparation were collected from heaved outcrop which could be most easily drilled, split and moved with the limited resources available. Consequently the samples may be less competent than larger, fresher samples collected from solid outcrop, where near surface elements of freeze-thaw action and exfoliation are less effective.
3. The evaluation of prospective sites is somewhat subjective, although an effort has been made to detail both the positive and negative features of each occurrence. The key factors used to rank occurrences are: uniformity of rock type, and consistent joint spacing in excess of 2 × 2 metres.
4. In the following site descriptions, "Land Status" has been included in order to provide a general idea of title. Prospective developers are advised to confirm details of ownership at district Land Registry offices.
5. The proximity of a potential building stone prospect to cultural features may or may not be a negative factor. If the stone is good, it may justify exploration of the same rock type in less sensitive areas.
6. In addition to the potential dimensional stone occurrences described in this report, it is believed that there is also considerable potential to develop quarries for flagstone, ashlar, paving, landscaping and decorative stone in central Ontario.

Work on the evaluation of potential building stones in central Ontario is part of an ongoing programme. Information on additional potential building stone sites is being compiled, and further reconnaissance work is planned during 1989. For further information on building stone opportunities in central Ontario contact:

Resident Geologist's Office,
Ministry of Northern Development and Mines,
P.O. Box 190, Main Street,
Dorset, Ontario, Canada.
POA 1EO.

Tel: (705) 766-2494.

Representative tiles from the sites described in this report and from other locations are available for viewing at the above office.

For information on building stone in other parts of Ontario, contact the Mineral Development and Lands Branch in Toronto, or staff of the appropriate Resident Geologists' Offices.

Mineral and Development and Lands Branch,
Mineral Development Section,
Ministry of Northern Development and Mines,
880 Bay Street, 3rd. Floor,
Toronto, Ontario, M5S 1Z8.

Tel: (416) 324-4796.

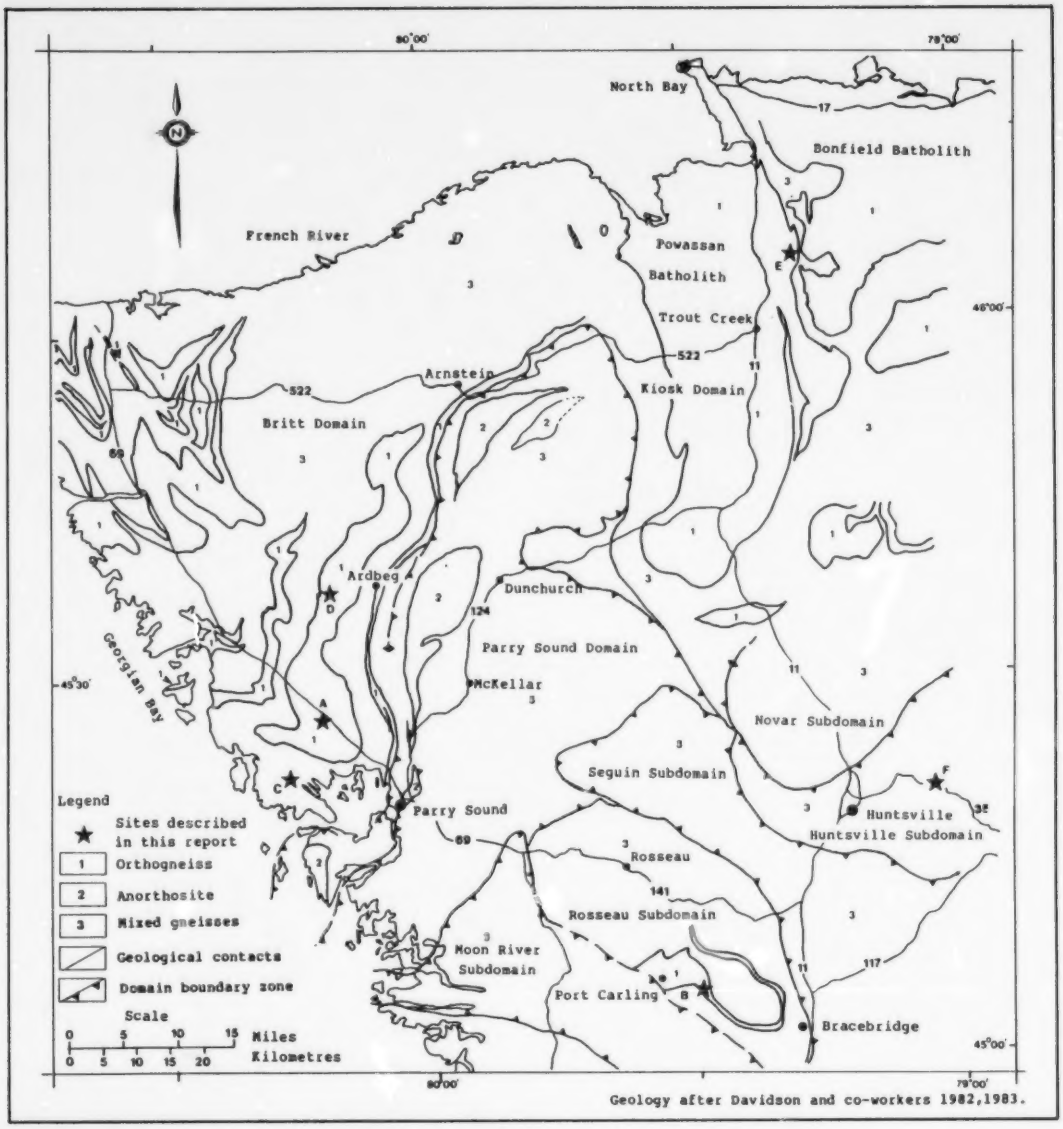


Figure 1: Simplified Geology and Location of Potential Building Stone Occurrences, Central Ontario.

Site A: Woods Road
Site B: Milford Bay
Site C: Killbear
Site D: Ardbeg
Site E: Genesee
Site F: Lehman Quarry

Site A Woods Road

Location

Carling Township, Conc. 5, Lot 7.
NTS: 41 H/8.
UTM: 565800e, 5033700n.

Access

Highway 69 passes 500 metres east of main outcrop; CPR passes 1000 metres west of main outcrop.

Land Status

Surface and mining rights largely vested in the Crown.

Description

Tiles illustrated were collected from broken blocks in the Ministry of Transportation (MOT) crushed aggregate quarry on the west side of Highway 69. The main outcrop is located 1100 metres at a bearing of 162 degrees from the gate of the MOT pit, in the same geological unit. Within a large outcrop area is a sparsely jointed zone some 150 m x 75 m, sloping gently south. Extensive outcrop occurs within a radius of one kilometre. Relief is up to 15 metres.

Rock Type

Name: Granitic migmatite.

Colour: Alternating pink and grey bands from 3 mm to 8 cm thick.

Texture: Strongly banded, overall planar, locally contorted.

Grain Size: Mainly about 1 mm, up to 5 mm.

Mineralogy: K-feldspar (35%), plagioclase (30%), quartz (25%), biotite (5%), hornblende (2%), magnetite (1%), sphene (1%), epidote (1%).

Pink bands are predominantly K-feldspar, grey bands are plagioclase-rich with biotite and hornblende.

Biotite locally forms thin sheets between pink and grey bands.

Structure

Migmatitic banding is generally gently dipping, sub-parallel to outcrop surface.

Lensoid mafic inclusions up to several metres thick and several tens of metres long are visible in the MOT pit, and might be expected elsewhere.

Joints: At the main outcrop only one joint set is visible, striking 160 degrees. Local clusters of joints are spaced one metre apart, but spacing is generally greater than 5 metres.

Surrounding outcrops display vertical to steeply dipping joints striking at 040, 110 and 160 degrees, spaced from 1-2 metres.

Irregular hematite-stained hairline fractures are visible in roadcuts on Highway 69, and in some tiles.

Positive Features

Few joints.

Good outcrop exposure.

Consistency of rock type, texture and colour.

Undeveloped Crown Land.

Negative Features

Relatively low relief.

Possible local planes of weakness may result from biotite sheets; tiles cut to date suggest that this may not be a major concern.

Possible hematite-stained hairline fractures.

References

Davidson et al., 1982.
Marmont et al., 1988.

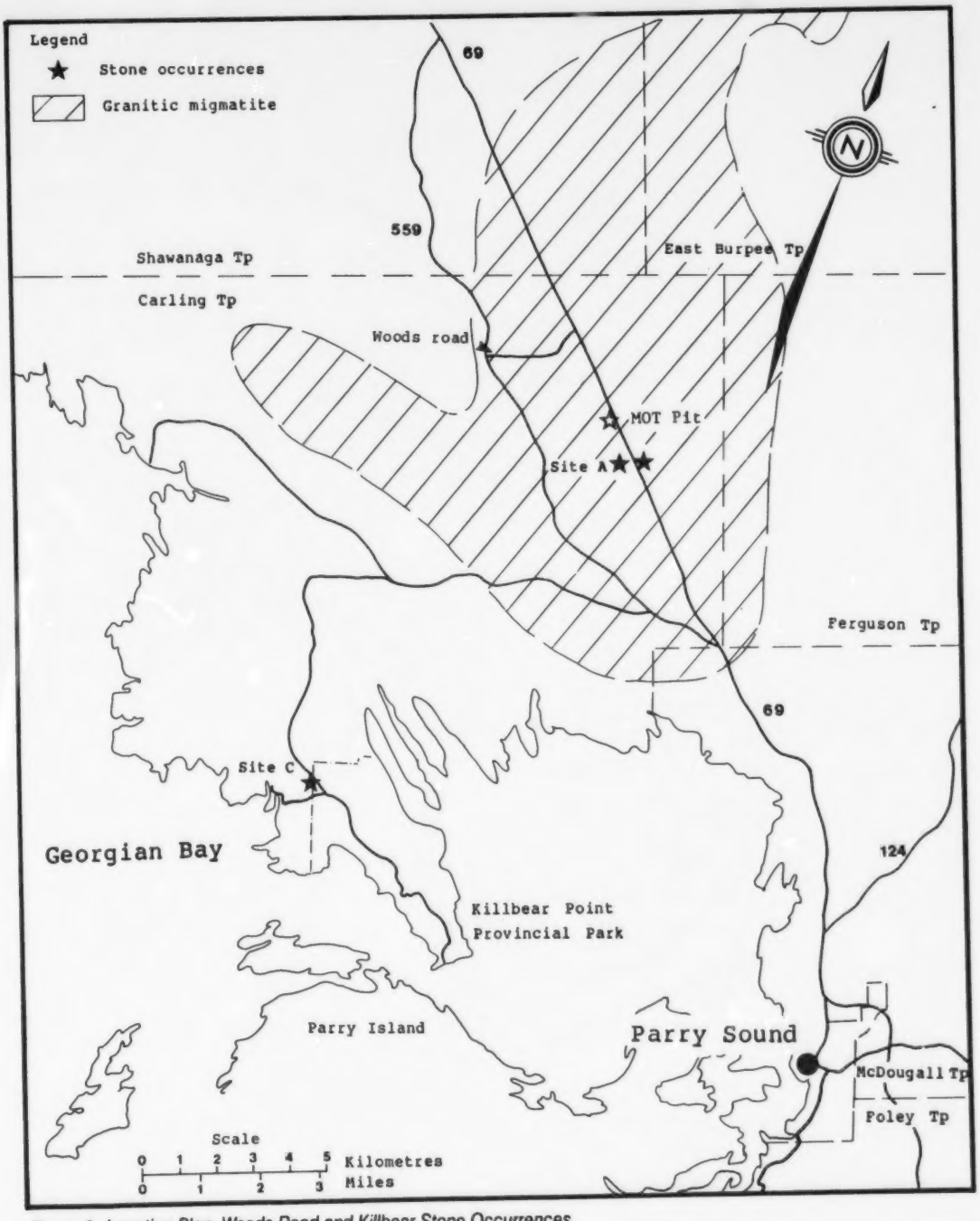


Figure 2: Location Plan, Woods Road and Killbear Stone Occurrences.

Site B Milford Bay

Location

Monck Township, Conc. 11, Lots 24 and 25.
NTS: 31 E/3.
UTM: 619550e, 4993650n.

Access

Highway 118 carves a major roadcut through the orthogneiss unit.

Land Status

Privately owned surface and mining rights.

Description

Good rock exposure occurs on both sides of the highway over an area of several acres. This is one of several small syenite bodies associated with more extensive bodies of quartz mangerite (orthopyroxene-bearing monzonite).

Rock Type

Name: Hornblende quartz syenite gneiss.

Colour: Deep pink-red with black streaks.

Texture: Complex gneissic foliation.

Grain Size: Mainly 1 to 2 mm, up to 5 mm.

Mineralogy: K-feldspar (65%), hornblende (14%), plagioclase (7%), quartz (6%), biotite (3%), garnet (2%), magnetite (1%), zircon (1%), orthopyroxene (1%), allanite (trace).

Structure

Gneissic banding is defined by hornblende-biotite aggregates dispersed through a feldspar-quartz-garnet groundmass. Layering is irregular and contorted in detail.

Garnet-rich clots or inclusions up to 20 cm long were noted in some tiles.

Some pegmatite veins traverse the outcrop.

Joints: 310, vertical; 187, vertical. Spacing is commonly greater than 5 metres.

Irregular sheeting is visible in the roadcut spaced 0.5 - 6.0 metres.

Positive Features

Very attractive and competent rock.

Good outcrop exposure, high relief.

Excellent access.

Negative Features

Cut by major roadcut - blasting could have produced micro-fractures, although this is not obvious in tiles cut from fly-rock.

Proximity to recreational developments on Lake Muskoka.

References

Davidson et al., 1982.
Schwerdtner, Bennett and Janes, 1977, p. 1028.
Schwerdtner and Waddington, 1978, p. 205.
Verschuren et al., 1986, p. 130-133.

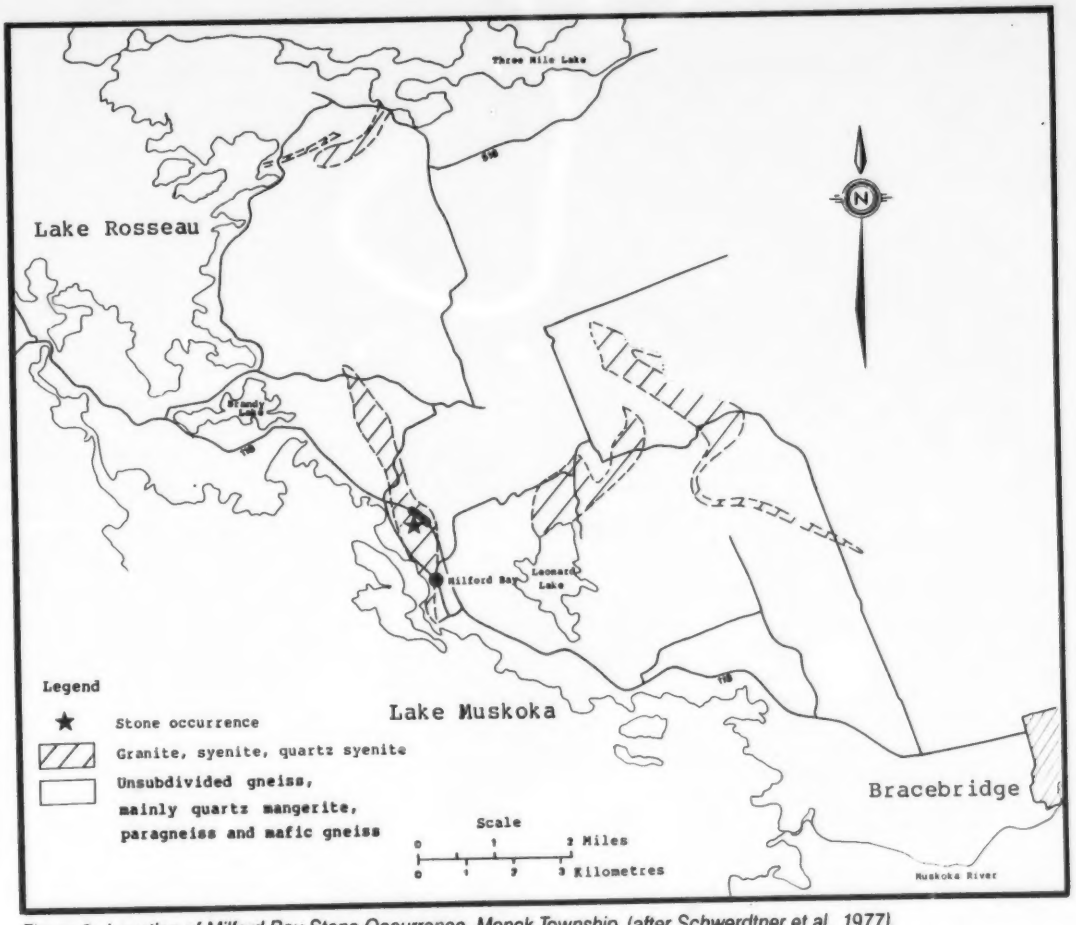


Figure 3: Location of Milford Bay Stone Occurrence, Monck Township (after Schwerdtner et al., 1977).

Site C Killbear

Location

Carling Township, Conc. 9, Lots 63-65.
NTS: 41 H/8.
UTM: 560300e, 5023500n.

Access

Along secondary Highway 559 heading west and south from Highway 69 to Killbear Point Provincial Park.

Land Status

Mixed private and Crown Land surface and mining rights.

Description

The tiles illustrated were cut from a block in a former crushed aggregate quarry, now used as the town dump. Joint density at this location is too great to permit recovery of a high proportion of large quarry blocks. However, extensive outcrop of this rock type occurs in the general area and Verschuren (1986) describes a prospective outcrop 900 metres to the west.

Rock Type

Name: Meta-arkose or granite gneiss.

Colour: Delicate even-coloured pink with mild swirls of paler and darker material.

Texture: Slightly migmatitic, resulting in scattered, irregular swirls and clots of coarser grained quartz-feldspar material, and dark bands of disseminated chlorite and biotite.

Grain Size: Mainly 1 to 2 mm, up to 5 mm.

Mineralogy: K-feldspar (40%), plagioclase (35%), quartz (20%), magnetite (1-2%), biotite-chlorite (2%), muscovite (trace), carbonate (trace). Some feldspars display blue irridescent splays of colour.

Structure

Minor thin irregular pink migmatitic and black bands.

Minor quartz-veining.

Joints: 025, vertical; 085, vertical; 150, vertical; 180, vertical. Spacings range up to 7 metres.

Positive Features

Very attractive, sound rock.

Good access.

Good outcrop exposure.

Negative Features

Variable joint spacing.

Proximity to recreational areas.

Comments

Exploration of this rock unit is recommended to locate areas of low joint density. No geological map is currently available which shows the extent of this unit, but it forms extensive prominent outcrops northwest of Killbear Park, including an interesting occurrence reported by Verschuren et al. (1986). Another occurrence is known at Three Mile Point on the northern shore of Parry Island.

References

Verschuren et al., 1986, p. 45-47.

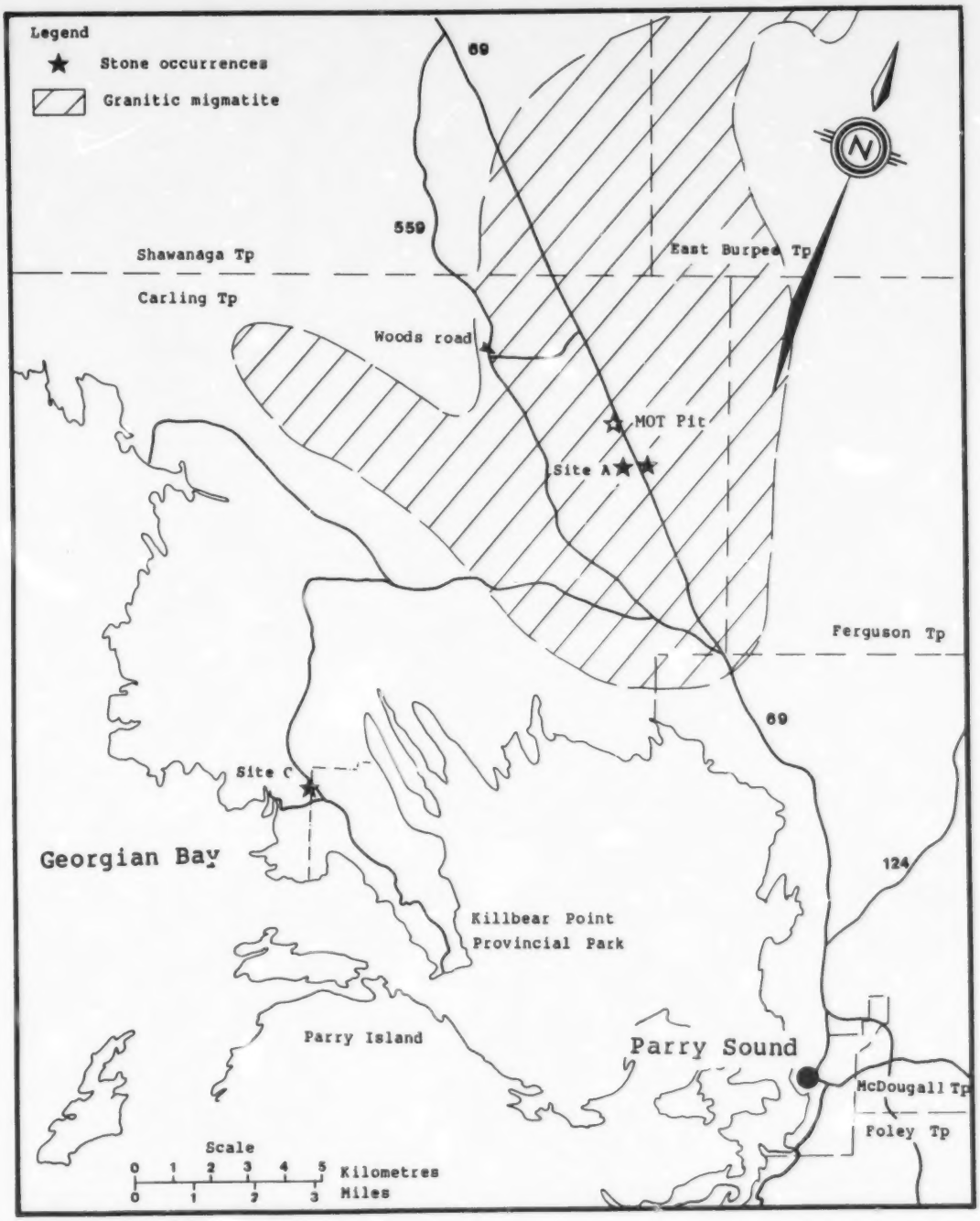


Figure 4: Location of Killbear and Woods Road Stone Occurrences.

Site D Ardbeg

Location

Burton Township, Concs. 1-3, lots 24-26.
NTS: 41 H/9.
UTM: Centred on 564900e, 5053300n.

Access

A poorly maintained gravel road provides access to hydro power lines from the CNR station at Ardbeg, some 35 km due north of Parry Sound. Ardbeg is located at the west-end of Highway 522.

Land Status

Mining and surface rights currently vested in the Crown.

Description

Extensive outcrops occur in the Black Lake area around a hydro power line. Relief is up to 20 metres. Within this area, three prominent joint sets, spaced at approximately 1.5 - 2.0 metres, limit large quarry block potential. However, one promising outcrop some 2-3 acres in size contains more widely spaced joints.

Rock Type

Name: Granitic migmatite.

Colour: Mauve, pink, black.

Texture: Strongly banded and complexly folded.

Grain Size: 1 to 2 mm, up to 10 mm in some pink migmatitic bands.

Mineralogy: K-feldspar (35%), plagioclase (30%), quartz (15%), biotite (8%), hornblende (5%), magnetite (2%), pyrite (1%), epidote (1%), sphene (1%), apatite (1%). Generally segregated into bands rich in hornblende and biotite or K-feldspar or quartz-feldspar.

Structure

General attitude is subparallel to the surface. Migmatitic banding is complexly folded.

Some variation in colour and texture, parts are only weakly banded.

Joints: 060, vertical; 110, vertical; 140, vertical; 360, vertical. There is insufficient relief to obtain a good impression of sheeting.

Positive Features

Unusual and attractive (mauve) colour and marble-like textures.

Undeveloped Crown Land.

Negative Features

Access road requires upgrading.

Colour and textural variations traditionally regarded as detrimental, could be exploited as positive features with this rock type.

Mineralogical banding, especially biotite-rich layers may cause local zones of weakness.

Widely scattered pyrite grains are surrounded by rust stains in some tiles.

Irregular hairline fractures caused breakage of some tiles. It is impossible to know at this stage whether this is an inherent trait of this rock type or is related to poor selection of samples from heaved outcrop subject to freeze-thaw, etc.

Oily looking brown staining occurs on tiles from one sample. Origin unknown: possibly a weathering feature.

References

Davidson et al., 1982.
Marmont et al., 1988.

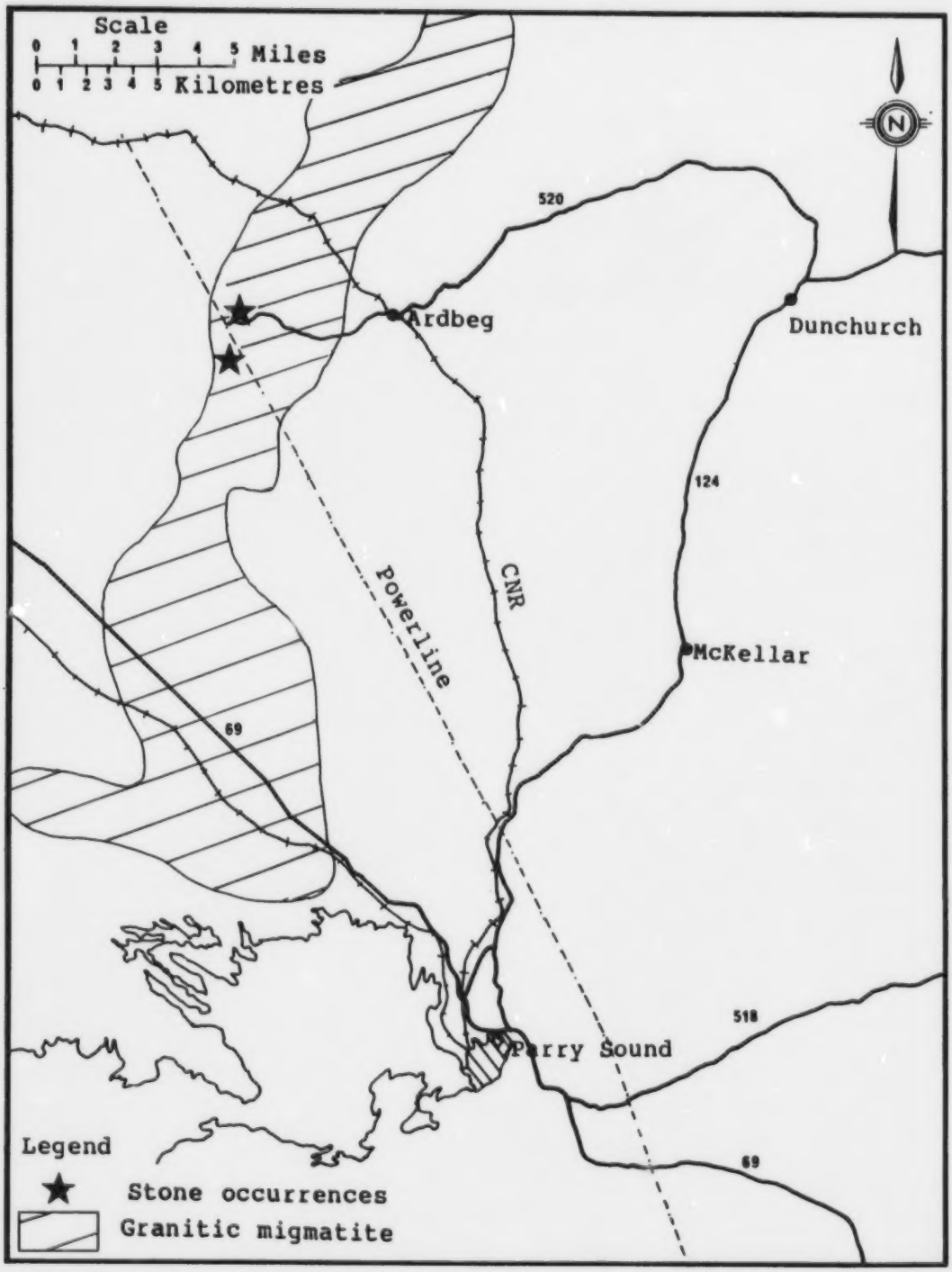


Figure 5: Location of Ardbeg Stone Occurrences.

Site E — Genesee Creek

Location

South Himsworth Township, Conc. 8, Lot 6.
NTS: 31 L/3.
UTM: 632200e, 5101800n.

Access

Alongside a maintained concession road, 5 km southeast of Powassan.

Land Status

Privately owned surface and mining rights; mixed farmland and bush.

Description

Moderately jointed, rounded outcrop rising 20 metres above the road. Forms a part of the Powassan Batholithic Complex. The extent of this unit is not known.

Rock Type

Name: Porphyritic granite.

Colour: Tiles are purplish brown. Surface samples display some variation from brown-grey to mauve-brown and greenish. It is not known if this variation applies to the fresh rock.

Texture: Porphyritic, generally massive, cataclastic to weakly foliated.

Grain Size: Feldspar megacrysts up to 3.5 cm in length, occur in a groundmass of 0.1 - 2.0 mm quartz and feldspar grains.

Mineralogy: Megacrysts of perthite and lesser microcline and plagioclase up to 3 cm long are scattered throughout a matrix of fine grained quartz and feldspar: Plagioclase (38%), K-feldspar (25%), quartz (23%), biotite (6%), hornblende (2%), myrmekite (2%), garnet (1%), epidote (1%), sphene (1%), magnetite (1%).

Structure

This site is part of the Powassan Batholithic Complex. Mainly massive porphyritic, and protoclastic. Some parts of the outcrop are weakly to moderately foliated with smaller (abraded) feldspar phenocrysts.

Joints: 023, 75 west, irregular but generally spaced at 2-4 metres; 085, vertical; 165, vertical.

Positive Features

Interesting brownish colour and porphyritic texture.

Positive relief, good access.

Moderate joint density.

Negative Features

Colour variation.

Textural and grain-size variation.

References

Verschuren et al., 1986, p. 186-191.

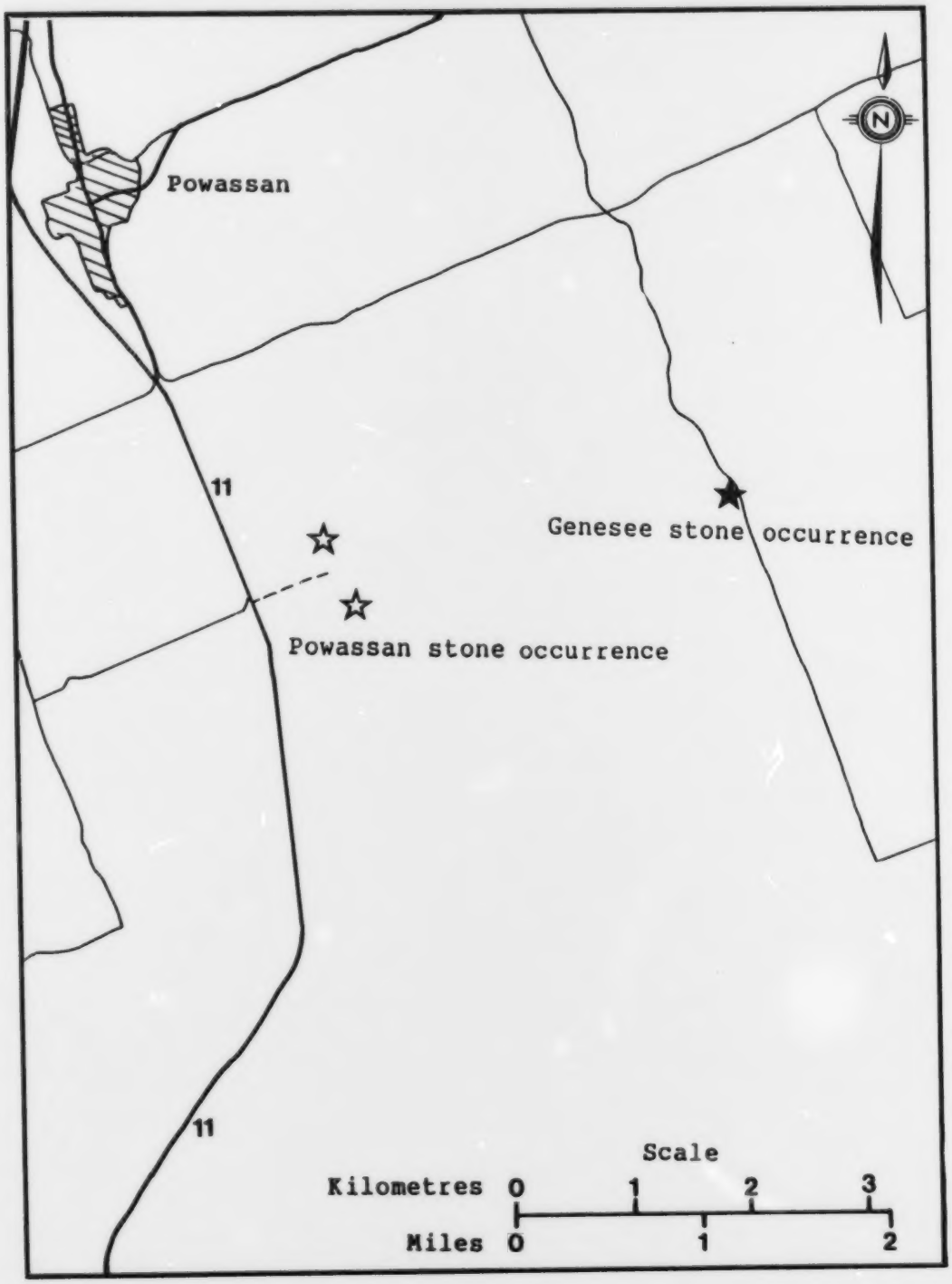


Figure 6: Location of Genesee Creek Stone Occurrence.

Site F — Lehman Quarry (formerly Fred Boothby Quarry)

Location

Sinclair Township, Conc. 1, Lot 18.
NTS: 31 E/6.
UTM: 651350e, 5024350n.

Access

North side of Highway 60, just west of junction with Millar Hill Road.

Land Status

Privately owned surface and mining rights.

Description

A small quarry, periodically active, supplies flagstone locally. The subhorizontal flaggy sheeting thickens with depth to over one metre spacing at the bottom of the quarry face. Unfortunately, several sets of vertical joints limit potential quarry blocks to 3-5 tonnes. However, the rock does take a good polish to yield an unusual and attractive pattern suitable for decorative applications.

Rock Type

Name: Biotite granite augen gneiss.

Colour: Medium to dark grey with flesh-coloured to orangy-pink lenses and streaks.

Texture: Gneissic - mylonitic, planar.

Grain Size: Fine grained: pink K-feldspar augen range up to 3 cm but many are granulated to form lenses up to 10 cm long and 1 cm thick that are composed of feldspar grains less than 1 mm. Garnet porphyroblasts range up to 4 mm. The fine grained matrix of quartz-feldspar-biotite is much less than 1 mm.

Mineralogy: Plagioclase (30%), K-feldspar (30%), quartz (25%), biotite (10%), garnet (2%), sphene (trace), magnetite (1%), apatite (trace).

Structure

Gently warped gneissic layering dips gently south, striking east-northeast.

Joints: subhorizontal, parallel to gneissic layering, spaced 5 cm - 1 m; 010, vertical; 075, vertical; 090, vertical; 115, vertical; 170, vertical; all spaced from less than 1 metre to 2 metres.

Positive Features

Readily accessible developed quarry.
Unique, attractive rock.

Negative Features

Excessive joint density precludes extraction of large quarry blocks.

Comments

Brief roadside reconnaissance of the rock unit failed to reveal areas of more favourable joint spacing suitable for dimensional stone extraction. However, more rigorous prospecting of this attractive unit may be warranted. It is otherwise suitable for use as ashlar, flagstone, paving, and decorative stone. Hewitt 1964 cites the following physical properties:

Maximum compressive strength, normal to foliation:	27,000 psi.
Minimum compressive strength:	23,750 psi.
Average compressive strength:	25,375 psi.
Absorption:	0.32 %
Bulk specific gravity:	2.65
Abrasive hardness:	35.6

References

Fouts (in press).
Hewitt 1964.
Martin, 1983.
Nadeau (in: Davidson et al., 1985).

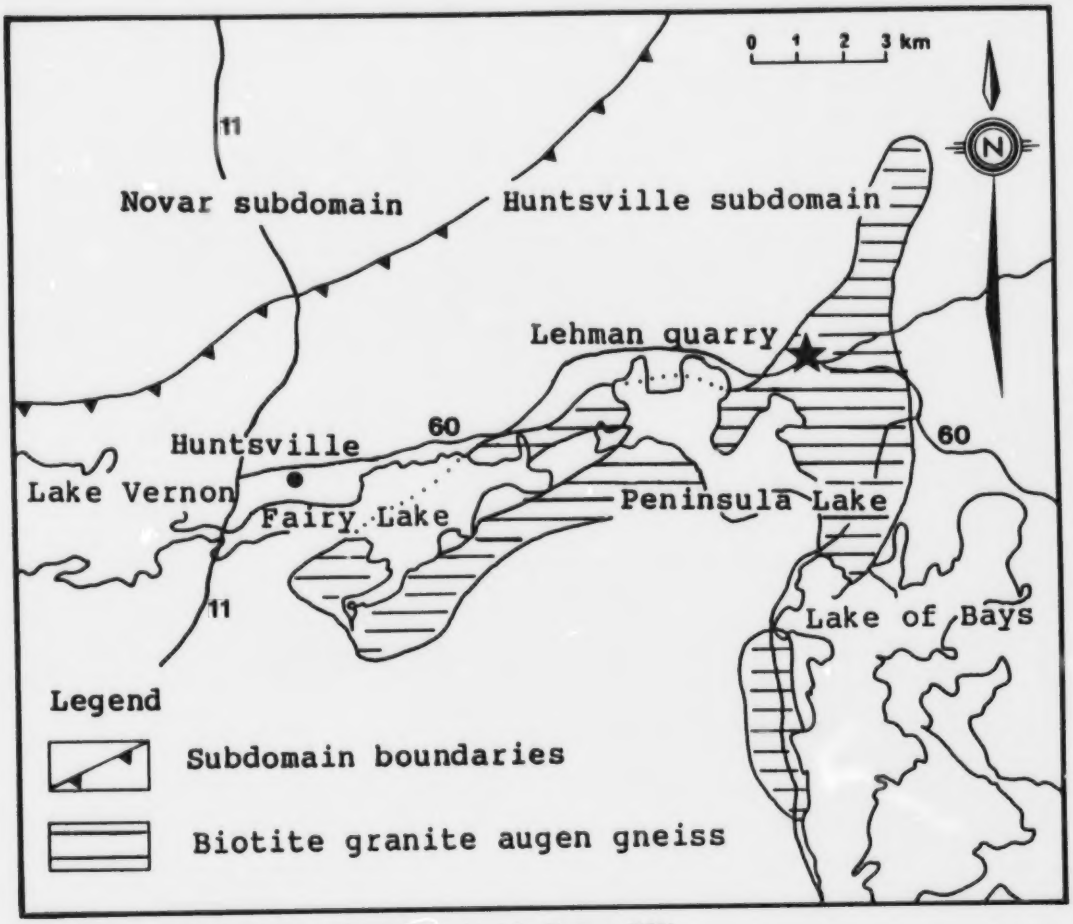


Figure 7: Location of Lehman Quarry, Sinclair Township (after Nadeau, 1985).

References

Anon.
1988: Italian Marble Center. Dimensional Stone, March 1988, p. 43.

Davidson, A. and Morgan, W.C.
1981: Preliminary Notes on the Geology East of Georgian Bay, Grenville Structural Province, Ontario; p. 291-298 in Current Research, Part A, Geological Survey of Canada, Paper 81-1A.

Davidson, A., Culshaw, N.G., and Nadeau, L.
1982: A tectono-metamorphic framework for part of the Grenville Province, Ontario; p. 175-190 in Current Research, Part A, Geological Survey of Canada, Paper 82-1A.

Davidson, A., Nadeau, L., Grant, S.M. and Pryer, L.L.
1985: Studies in the Grenville Province of Ontario; p. 463-483 in Current Research, Part A, Geological Survey of Canada, Paper 85-1A.

Davidson, A. and Grant, S.M.
1986: Reconnaissance geology of western and central Algonquin Park and detailed study of coronitic olivine metagabbro, Central Gneiss Belt, Grenville Province of Ontario; p. 837-848 in Current Research, Part B, Geological Survey of Canada, Paper 86-1B.

Fouts, C.R.
1989: Gneisses in the Parry Sound-Muskoka Area: Flagstone Resources; Ontario Geological Survey, Open File Report, (in press).

Hewitt, D.F.
1964: Building Stones of Ontario, Part V, Granite and Gneiss; Ontario Department of Mines, Industrial Mineral Report 19, 51 p.

Lumbers, S.B.
1971: Geology of the North Bay Area, Districts of Nipissing and Parry Sound; Ontario Department of Mines and Northern Affairs, Geological Report 94, 104 p. Accompanied by Map 2216, scale 1 inch to 2 miles.

Marmont, C. and Johnston, M.
1987a: Mineral Deposit Studies in the Huntsville-Parry Sound-Powassan Area - A Progress Report; Ontario Geological Survey, Open File Report 5647.

Marmont, C. and Johnston, M.
1987b: Industrial Minerals, Rare Earth Elements and Building Stone in the Muskoka-Parry Sound-Nipissing Area, Ontario Geological Survey, Miscellaneous Paper 137, p. 329-331.

Marmont, C., Zubere[illegible] P.M. and Conrod, W.D.
1988: Industrial Minerals, Rare Earth Elements and Building Stone in the Districts of Muskoka, Parry Sound and Nipissing, and the County of Haliburton, Ontario Geological Survey, Miscellaneous Paper 141, p. 319-325.

Martin, Wendy
1983: Industrial Minerals of the Algonquin Region; Ontario Geological Survey, Open File Report 5425, 316 p. Accompanied by Maps P. 2562, P. 2563, P. 2564, P. 2565, P. 2566, and P. 2567, scale 1:125,000.

Schwerdtner, W.M., Bennett, P.J. and Janes, T.W.
1977: Application of L-S fabric scheme to structural mapping and paleostrain analysis; Canadian Journal of Earth Sciences, Volume 14, p. 1021-1032.

Schwerdtner, W.M. and Waddington, D.H.
1978: Structure and lithology of Muskoka-southern Georgian Bay region, Central Ontario; p. 204-212 in Toronto '78, Field Trips Guidebook, edited by A.L. Currie and W.O. Mackasey, Geological Association of Canada.

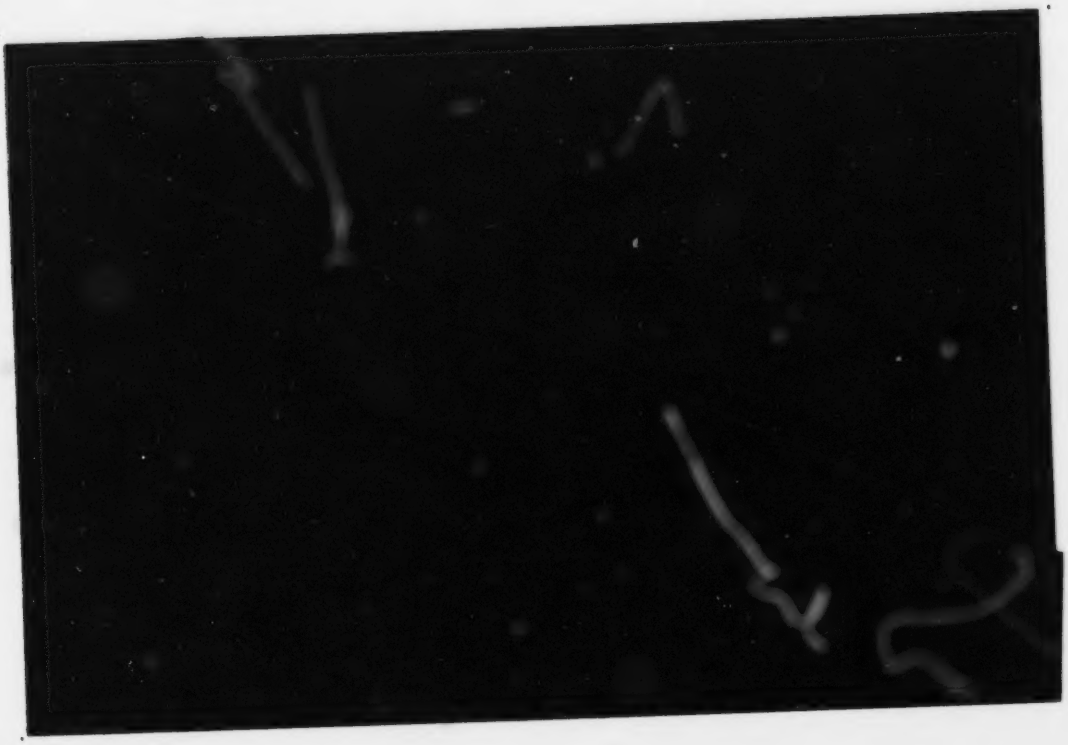
Verschuren, C.P., Papertzian, V.C., Kingston, P.W., and Villard, D.J.
1986: Reconnaissance Survey of Building Stones of Eastern and Central Ontario; Ontario Geological Survey, Open File Report 5585.

Photographs shown on the following pages are actual size reproductions of tiles described in this report.

Colour reproduction is as accurate as the printing process permits, and is a very close match to that of the tiles. However, there is no substitute for seeing samples of the rocks in question, and the interested reader is invited to view samples at the Resident Geologist's office, Dorset, Ontario.

Woods Road, Granitic migmatite

Milford Bay, Quartz syenite



Killbear, Meta-arkose

Ardbeg, Granitic migmatite

Genesee Creek, Porphyritic granite

Lehman Quarry, Augen Gneiss